

10 CSR 10-5.540 Control of Emissions From Batch Process Operations

(1) Applicability.

- (A) This rule shall apply throughout the City of St. Louis and St. Charles, St. Louis, Jefferson and Franklin Counties.
- (B) This rule is applicable to all batch process operations that have the potential to emit equal to or greater than one hundred (100) tons per year of volatile organic compounds (VOC) at sources identified by any of the following four (4)-digit standard industrial classification (SIC) codes, as defined in the 1987 edition of the *Federal Standard Industrial Classification Manual*: SIC 2821, 2833, 2834, 2861, 2865, 2869, and 2879.
- (C) The following single unit operations and batch process trains are subject to this rule but are considered to be *de minimis* and are, therefore, exempt from the control requirements of section (3) of this rule. However, the record keeping and reporting requirements in section (4) of this rule shall apply to such *de minimis* single unit operations and batch process trains:
 - 1. Within a batch process operation, any single unit operation with uncontrolled total annual mass emissions of less than or equal to five hundred (500) pounds per year (lb/yr) of VOC. Such single unit operations are also excluded from the calculation of the total annual mass emissions for a batch process train. If the uncontrolled total annual mass emissions from such exempt single unit operation exceed five hundred (500) lb/yr of VOC in any subsequent year, the source shall calculate applicability in accordance with subsection (1)(E) of this rule for both the individual single unit operation and the batch process train containing the single unit operation; and
 - 2. Any batch process train containing process vents that have, in the aggregate, uncontrolled total annual mass emissions, as determined in accordance

with paragraph (3)(E)1. of this rule, of less than thirty thousand (30,000) lb/yr of VOC for all products manufactured in such batch process train.

(D) The applicability equations in subsection (1)(E) of this rule, which require the calculation of uncontrolled total annual mass emissions and flow rate value, shall be used to determine whether a single unit operation or a batch process train is subject to the control requirements in section (3) of this rule. The applicability equation shall be applied to the following:

1. Any single unit operation with uncontrolled total annual mass emissions that exceed five hundred (500) lb/yr and with a VOC concentration greater than five hundred (500) parts per million by volume (ppmv). In this individual determination, no applicability analysis shall be performed for any single unit operation with a VOC concentration of less than or equal to five hundred (500) ppmv; and
2. Any batch process train containing process vents which, in the aggregate, have uncontrolled total annual mass emissions of thirty thousand (30,000) lb/yr or more of VOC from all products manufactured in the batch process train. Any single unit operation with uncontrolled total annual mass emissions exceeding five hundred (500) lb/yr, regardless of VOC concentration, shall be included in the aggregate applicability analysis.

(E) Applicability equations. The applicability equations in this rule subsection are specific to volatility.

1. Weighted average volatility (WAV) shall be calculated as follows:

$$WAV = \frac{\sum_{i=1}^n \left[\frac{(VP_i) \times (MVOC_i)}{(MWVOC_i)} \right]}{\sum_{i=1}^n \left[\frac{(MVOC_i)}{(MWVOC_i)} \right]}$$

where:

WAV = Weighted average volatility;
 MVOC_i = Mass of VOC component i;
 MWVOC_i = Molecular weight of VOC component i; and
 VP_i = Vapor pressure of VOC component i.

2. For purposes of determining applicability, flow rate values shall be calculated as follows:

- A. Low WAV has a vapor pressure less than or equal to seventy five (75) millimeters of Mercury (mmHg) at twenty degrees Celsius (20°C), and shall use the following equation:

$$FR = [0.07 (UTAME)] - 1,821$$

Where:

FR = Vent stream flow rate, expressed as standard cubic feet per minute (scfm);
 UTAME = Uncontrolled total annual mass emissions of VOC, expressed as lb/yr;

- B. Moderate WAV has a vapor pressure greater than seventy five (75) mmHg but less than or equal to one hundred fifty (150) mmHg at twenty degrees Celsius (20°C), and shall use the following equation:

$$FR = [0.031 (UTAME)] - 494$$

- C. High WAV has a vapor pressure greater than one hundred fifty (150) mmHg at twenty degrees Celsius (20°C), and shall use the following equation:

$$FR = [0.013 (UTAME)] - 301$$

3. To determine the vapor pressure of VOC, the applicable methods and procedures in section (5) of this rule shall apply.

- (F) In the event that other rules in Title 10 Division 10 of the *Code of State Regulations* are also applicable to batch process operations, the more stringent rule shall apply.

(2) Definitions.

- (A) Batch—A discontinuous process involving the bulk movement of material through sequential manufacturing steps, typically characterized as non-steady-state.
- (B) Batch cycle—A manufacturing event of an intermediate or product from start to finish in a batch process.
- (C) Batch process operation—A discontinuous operation in which a discrete quantity or batch of feed is charged into a chemical manufacturing process unit and distilled or reacted, or otherwise used at one time, and may include, but is not limited to, reactors, filters, dryers, distillation columns, extractors, crystallizers, blend tanks, neutralizer tanks, digesters, surge tanks and product separators. After each batch process operation, the equipment is generally emptied before a fresh batch is started.
- (D) Batch process train—The collection of equipment (e.g., reactors, filters, dryers, distillation columns, extractors, crystallizers, blend tanks, neutralizer tanks, digesters, surge tanks and product separators) configured to produce a product or intermediate by a batch process operation. A batch process train terminates at the point of storage of the product or intermediate being produced in the batch process train. Irrespective of the product being produced, a batch process train which is independent of other processes shall be considered a single batch process train for purposes of this rule.
- (E) Control devices—Air pollution abatement devices. For purposes of this rule, condensers operating under reflux conditions are not considered control devices.

- (F) Emission events—Discrete venting episodes that may be associated with a single unit of operation.
- (G) Processes—Any equipment within a contiguous area that are connected together during the course of a year where connected is defined as a link between equipment, whether it is physical, such as a pipe, or whether it is next in a series of steps from which material is transferred from one unit operation to another.
- (H) Unit operations—Discrete processing steps that occur within distinct equipment that are used to prepare reactants, facilitate reactions, separate and purify products, and recycle materials.
- (I) Vent—A point of emission from a unit operation. Typical process vents from batch processes include condenser vents, vacuum pumps, steam ejectors, and atmospheric vents from reactors and other process vessels. Vents also include relief valve discharges. Equipment exhaust systems that discharge from unit operations also would be considered process vents.
- (J) Volatility—For purposes of this rule, low volatility materials are defined as those which have a vapor pressure less than or equal to seventy five (75) mmHg at twenty degrees Celsius (20°C), moderate volatility materials have a vapor pressure greater than seventy five (75) and less than or equal to one hundred fifty (150) mmHg at twenty degrees Celsius (20°C), and high volatility materials have a vapor pressure greater than one hundred fifty (150) mmHg at twenty degrees Celsius (20°C). To evaluate VOC volatility for single unit operations that service numerous VOCs or for processes handling multiple VOCs, the weighted average volatility can be calculated from knowing the total amount of each VOC used in a year, and the individual component vapor pressure, per the equation in paragraph (1)(E)1. of this rule.
- (K) Definitions of certain terms, other than those specified in this rule, may be found in 10 CSR 10-6.020.

(3) General Provisions.

- (A) Every owner or operator of a single unit operation with an average flow rate, as determined in accordance with paragraph (3)(E)2. of this rule, below the flow rate value calculated by the applicability equations contained in subsection (1)(E) of this rule, shall reduce uncontrolled VOC emissions from such single unit operation by an overall efficiency, on an annual average, of at least ninety percent (90%), or twenty (20) ppmv, per batch cycle.
- (B) Every owner or operator of a batch process train with an average flow rate, as determined in accordance with subparagraph (3)(E)2.B. of this rule, below the flow rate value calculated by the applicability equations contained in subsection (1)(E) of this rule, shall reduce uncontrolled VOC emissions from such batch process train by an overall efficiency, on an annual average, of at least ninety percent (90%), or twenty (20) ppmv, per batch cycle. For purposes of demonstrating compliance with the emission limitations in this rule section, any control device meeting the criteria in subsection (3)(D) of this rule shall be deemed to achieve a control efficiency of ninety percent (90%), or twenty (20) ppmv, per batch cycle, as applicable.
- (C) Notwithstanding subsection (3)(A) or (3)(B) of this rule, any source that has installed on or before December 15, 1999, any control device which is demonstrated to the department's satisfaction to be unable to meet the applicable control requirements of this rule section, a scrubber, or shell and tube condenser using a non-refrigerated cooling media, and such device achieves at least eighty-one percent (81%) control efficiency of VOC emissions, is required to meet the ninety percent (90%) emission limitation or twenty (20) ppmv VOC concentration in subsection (3)(A) or (3)(B) of this rule, as applicable, upon the earlier to occur of the date the device is replaced for any reason, including, but not limited to, normal maintenance, malfunction, accident, and obsolescence,

or May 1, 2002. Control devices installed on or before December 15, 1999, that do not achieve at least eighty-one percent (81%) control efficiency of VOC emissions shall comply with the control requirements of subsection (3)(A) or (3)(B) on or before May 1, 2001. A scrubber, shell and tube condenser using a non-refrigerated cooling media, or other control device meeting the criteria of this rule subsection, is considered replaced when:

1. The entire device is replaced; or
2. When either the cost to repair the device or the cost to replace part of the device exceeds fifty percent (50%) of the cost of replacing the entire device with a control device that complies with the ninety percent (90%) emission limitation or twenty (20) ppmv VOC concentration level in subsection (3)(A) of this rule, as applicable.

(D) Control Equipment Specifications.

1. If a boiler or process heater is used to comply with this rule section, the vent stream shall be introduced into the flame zone of the boiler or process heater. The boiler or process heater shall meet the control device requirements for boilers and process heaters included in 40 CFR 60.703, 60.704, and 60.705.
2. If a flare is used to comply with this rule section, it shall comply with the requirements of 40 CFR 60.18, which are hereby incorporated by reference. The flare operation requirements of 40 CFR 60.18 do not apply if a process, not subject to this rule, vents an emergency relief discharge into a common flare header and causes the flare servicing the process subject to this rule to not comply with one or more of the provisions of 40 CFR 60.18. This exemption from flare specification requirements is a temporary exemption lasting only for the period of time during the emergency relief venting discharge.

3. If an afterburner, scrubber, absorber, condenser or adsorber is used to comply with this rule section, such equipment shall meet the control device requirements for this equipment included in 40 CFR 60.703, 60.704, and 60.705.
 4. If an incinerator is used to comply with this rule section, the incinerator shall meet the control device requirements for incinerators included in 40 CFR 60.703, 60.704, and 60.705.
- (E) Determination of uncontrolled total annual mass emissions and actual weighted average flow rate values for batch process operations.
1. Uncontrolled total annual mass emissions shall be determined by the following methods:
 - A. Direct process vent emissions measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring the mass flow rate of VOC incoming to the control device as in paragraph (5)(F)2. and subparagraphs (5)(F)3.A. and (5)(F)3.B. of this rule; or
 - B. Engineering estimates of the uncontrolled VOC emissions from a process vent or process vents, in the aggregate, within a batch process train, using either the potential or permitted number of batch cycles per year or total production as represented in the source's operating permit.
- (I) Engineering estimates of the uncontrolled VOC emissions shall be based upon accepted chemical engineering principles, measurable process parameters, or physical or chemical laws and their properties. Examples of

methods include, but are not limited to, the following:

- (a) Use of material balances based on process stoichiometry to estimate maximum VOC concentrations;
- (b) Estimation of maximum flow rate based on physical equipment design such as pump or blower capacities; and
- (c) Estimation of VOC concentrations based on saturation conditions.

(II) All data, assumptions and procedures used in any engineering estimate shall be documented.

2. Average flow rate shall be determined by any of the following methods:

- A. Direct process vent flow rate measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring incoming volumetric flow rate in paragraph (5)(F)2. of this rule;
- B. Average flow rate for a single unit operation having multiple emission events or batch process trains shall be the weighted average flow rate, calculated as follows:

$$WAF = \frac{\sum_{i=1}^n (AFR_i \times ADE_i)}{\sum_{i=1}^n (ADE_i)}$$

where:

WAF = Actual weighted average flow rate
for a single unit operation or batch
process train;

AFR_i = Average flow rate per emission
event;

ADE_i = Annual duration of emission event;
and

n = Number of emission events.

For purposes of this formula, the term "emission event" shall be defined as a discrete period of venting that is associated with a single unit operation. For example, a displacement of vapor resulting from the charging of a single unit operation with VOC will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. The expulsion of expanded vapor space when the single unit operation is heated is also an emission event. Both of these examples of emission events and others may occur in the same single unit operation during the course of the batch cycle. If the flow rate measurement for any emission event is zero, according to paragraph (5)(F)2. of this rule, then such event is not an emission event for purposes of this rule section; or

C. Engineering estimates calculated in accordance with the requirements in subparagraph (3)(E)1.B. of this rule.

3. For purposes of determining the average flow rate for steam vacuuming systems, the steam flow shall be included in the average flow rate calculation.

4. In cases where two or more single unit operations share a process vent and where flow measurement for such single unit operations is difficult, alternate methods of flow measurement may be used only when approved by the department.

(4) Reporting and Record Keeping.

- (A) Every owner or operator of a *de minimis* single unit operation or batch process train exempt under paragraph (1)(C)1. or (1)(C)2. of this rule shall keep records of the uncontrolled total annual mass emissions for any *de minimis* single unit operation or batch process train, as applicable, and documentation verifying these values or measurements. The documentation shall include the engineering calculations, any measurements made in accordance with section (5) of this rule, and the potential or permitted number of batch cycles per year, or, in the alternative, total production as represented in the source's operating permit.
- (B) Every owner or operator of a single unit operation exempt under subsection (1)(D) of this rule shall keep the following records:
 1. The uncontrolled total annual mass emissions and documentation verifying these values or measurements. The documentation shall include any engineering calculations, any measurements made in accordance with section (5) of this rule, and the potential or permitted number of batch cycles per year or, in the alternative, total production as represented in the source's operating permit; and
 2. The average flow rate in standard cubic feet per minute (scfm) and documentation verifying this value.
- (C) Every owner or operator of a batch process operation subject to the control requirements of section (3) of this rule shall keep records of the following parameters required to be monitored under subsection (4)(I) of this rule:

1. If using a thermal or catalytic afterburner to comply with section (3) of this rule, records indicating the average combustion chamber temperature of the afterburner or the average temperature upstream and downstream of the catalyst bed for a catalytic afterburner, measured continuously and averaged over the same time period as the performance test;
2. If using a flare to comply with section (3) of this rule, continuous records of the flare pilot flame monitoring and records of all periods of operations during which the pilot flame is absent; or
3. If using any of the following as a control device, the following records:
 - A. Where a scrubber is used, the exit specific gravity or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved by the department, and the average exit temperature of the absorbing liquid, measured continuously and averaged over the same time period as the performance test both measured while the vent stream is routed normally;
 - B. Where a condenser is used, the average exit or product side temperature measured continuously and averaged over the same time period as the performance test while the vent stream is routed normally;
 - C. Where a carbon adsorber is used, the total steam mass flow measured continuously and averaged over the same time period as the performance test full carbon bed cycle, temperature of the carbon bed after regeneration and within fifteen (15) minutes after completion of any cooling cycle(s), and duration of the carbon bed steaming cycle all

measured while the vent stream is routed normally; or

- D. As an alternative to subparagraphs (4)(C)3.A., (4)(C)3.B. or (4)(C)3.C. of this rule, at a minimum, records indicating the concentration level or reading indicated by the VOC monitoring device at the outlet of the scrubber, condenser or carbon adsorber, measured continuously and averaged over the same time period as the performance test while the vent stream is routed normally.
- (D) Every owner or operator of a single unit operation claiming a vent stream concentration exemption level shall maintain records to indicate the vent stream concentration is less than or equal to five hundred (500) ppmv, and shall notify the department in writing if the vent stream concentration at any time equals or exceeds five hundred (500) ppmv, within sixty (60) days after such event. Such notification shall include a copy of all records of such event.
- (E) An owner or operator of a batch process operation subject to the control requirements of section (3) of this rule may maintain alternative records other than those listed in subsection (4)(C) of this rule. Any alternative recordkeeping shall be approved by the department and shall be contained in the source's operating permit as federally enforceable permit conditions.
- (F) Notwithstanding subsections (4)(A) through (4)(E) of this rule, any owner or operator of a batch process operation which uses either a scrubber, shell and tube condenser using non-refrigerated cooling media, or other control device meeting the criteria of subsection (3)(D) of this rule, is required to monitor compliance with the requirements on and after the earlier to occur of the date such device is replaced for any reason or May 1, 2002.

- (G) The owner or operator of a *de minimis* single unit operation or batch process train exempt from the control requirements of section (3) of this rule shall notify the department in writing if the uncontrolled total annual mass emissions from such *de minimis* single unit operation or batch process train exceed the threshold in paragraph (1)(C)1. or (1)(C)2. of this rule, respectively, within sixty (60) days after the event occurs. Such notification shall include a copy of all records of such event.
- (H) Every owner or operator of a batch process operation required to keep records under this rule section shall maintain such records on site for at least five (5) years and shall make all such records available to the department immediately upon request.
- (I) Monitoring Requirements.
 - 1. Every owner or operator using an afterburner to comply with section (3) of this rule shall install, calibrate, maintain and operate, according to manufacturer's specifications, temperature monitoring devices with an accuracy of plus or minus one percent ($\pm 1\%$) of the temperature being measured expressed in degrees Celsius, equipped with continuous recorders.
 - A. Where a catalytic afterburner is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.
 - B. Where an afterburner other than a catalytic afterburner is used, a temperature monitoring device shall be installed in the combustion chamber.
 - 2. Every owner or operator using a flare to comply with section (3) of this rule, shall install, calibrate, maintain and operate, according to manufacturer's specifications, a heat sensing device, such as an ultra-violet beam sensor or

thermocouple, at the pilot light to indicate continuous presence of a flame.

3. Every owner or operator using a scrubber to comply with section (3) of this rule shall install, calibrate, maintain, and operate, according to manufacturer's specifications, the following:
 - A. A temperature monitoring device for scrubbant liquid having an accuracy of plus or minus one percent ($\pm 1\%$) of the temperature being monitored expressed in degrees Celsius and a specific gravity device for scrubbant liquid, each equipped with a continuous recorder; or
 - B. A VOC monitoring device used to indicate the concentration of VOC exiting the control device based on a detection principle such as infra-red, photoionization or thermal conductivity, each equipped with a continuous recorder.
4. Every owner or operator using a condenser to comply with section (3) of this rule shall install, calibrate, maintain, and operate, according to manufacturer's specifications, the following:
 - A. A condenser exit temperature monitoring device equipped with a continuous recorder and having an accuracy of plus or minus one percent ($\pm 1\%$) of the temperature being monitored expressed in degrees Celsius; or
 - B. A VOC monitoring device used to indicate the concentration of VOC such as infra-red, photoionization or thermal conductivity, each equipped with a continuous recorder.
5. Every owner or operator using a carbon adsorber to comply with this rule shall install, calibrate, maintain, and operate, according to the

manufacturer's specifications, the following equipment:

- A. An integrating regeneration stream flow monitoring device having an accuracy of \pm ten percent (10%), and a carbon bed temperature monitoring device having an accuracy of plus or minus one percent (\pm 1%) of the temperature being monitored expressed in degrees Celsius, both equipped with a continuous recorder; or
 - B. A VOC monitoring device used to indicate the concentration level of VOC exiting such device based on a detection principle such as infra-red, photoionization or thermal conductivity, each equipped with a continuous recorder.
- 6. Every owner or operator using a boiler or process heater with a design heat input capacity less than forty-four (44) megawatts to comply with section (3) of this rule shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a temperature monitoring device in the firebox with an accuracy of plus or minus one percent (\pm 1%) of the temperature being measured expressed in degrees Celsius, equipped with a continuous recorder. Any boiler or process heater in which all process vent streams are introduced with primary fuel is exempt from this requirement.
 - 7. The owner or operator of a process vent shall be permitted to monitor by an alternative method or may monitor parameters other than those listed in paragraphs (4)(I)1. through (4)(I)6. of this rule, if approved by the department. Such alternative method or parameters shall be contained in the source's operating permit as federally enforceable permit conditions.
 - 8. Notwithstanding paragraphs (4)(I)1. through

(4)(I)7. of this rule, sources using a scrubber, shell and tube condenser using a non-refrigerated cooling media, or other control device meeting the criteria of subsection (3)(D) of this rule, are required to monitor compliance with the requirements of this rule on and after the earlier to occur of the date such device is replaced for any reason or May 1, 2002.

(5) Test Methods.

- (A) Upon the department's request, the owner or operator of a batch process operation shall conduct testing to demonstrate compliance with section (3) of this rule. The owner or operator shall, at its own expense, conduct such tests in accordance with the applicable test methods and procedures specified in subsections (5)(D), (5)(E), and (5)(F) of this rule.
- (B) Notwithstanding subsection (5)(A) of this rule, flares and process boilers used to comply with control requirements of section (3) of this rule shall be exempt from performance testing requirements.
- (C) When a flare is used to comply with the control requirements of section (3) of this rule, the flare shall comply with the requirements of 40 CFR 60.18.
- (D) The owner or operator of a batch process operation that is exempt from the control requirements of section (3) of this rule shall demonstrate, upon the department's request, the absence of oversized gas moving equipment in any manifold. Gas moving equipment shall be considered oversized if it exceeds the maximum requirements of the exhaust flow rate by more than thirty percent (30%).
- (E) For the purpose of demonstrating compliance with the control requirements in section (3) of this rule, the batch process operation shall be run at representative operating conditions and flow rates during any performance test.

(F) The following methods in 40 CFR 60, Appendix A, which are hereby incorporated by reference, shall be used to demonstrate compliance with the reduction efficiency requirement in section (3) of this rule:

1. Method 1 or 1A, as appropriate, for selection of the sampling sites if the flow measuring device is not a rotameter. The control device inlet sampling site for determination of vent stream VOC composition reduction efficiency shall be prior to the control device and after the control device;
2. Method 2, 2A, 2C, 2D, 2F, 2G or 2H as appropriate, for determination of gas stream volumetric flow rate flow measurements, which shall be taken continuously. No traverse is necessary when the flow measuring device is an ultrasonic probe; and
3. Method 25A or Method 18, if applicable, to determine the concentration of VOC in the control device inlet and outlet, where—
 - A. The sampling time for each run shall be as follows:
 - (I) For batch cycles less than eight (8) hours in length, appropriate operating parameters shall be recorded at a minimum of fifteen (15) minute intervals during the batched period;
 - (II) For batch cycles of eight (8) hours and greater in length, the owner or operator may either test in accordance with the test procedures defined in part (5)(F)3.A.(I) of this rule or the owner or operator may elect to perform tests, pursuant to either Method 25A or Method 18, only during those portions of each emission event which profiles a representative sample occurring within the batch cycle. For each emission event of less than four (4) hours in duration, the owner or operator shall test continuously over the

entire emission event as in part (5)(F)3.A.(I) of this rule. For each emission event of greater than four (4) hours in duration, the owner or operator shall elect either to perform a minimum of three (3) one-hour test runs during the emission event or shall test continuously over the entire emission event within each single unit operation in the batch process train. The owner or operator shall define the total batch process by all its intrinsic emission events. To demonstrate that the portion of the emission event to be tested profiles a representative sample occurring within the batch cycle, the owner or operator electing to rely on this option shall develop an emission profile for each entire emission event. Such emission profile shall be based upon either process knowledge or test data collected. Examples of information that could constitute process knowledge include, but are not limited to, calculations based on material balances, duration, emission levels, constituents, reactants, byproducts and process stoichiometry. Previous test results may be used provided such results are still relevant to the current process vent stream conditions; or

- (III) For purposes of paragraph (5)(F)3. of this rule, the term "emission event" shall be defined as a discrete period of venting that is associated with a single unit operation. For example, a displacement of vapor resulting from the charging of a single unit operation with VOC will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. The expulsion of expanded single unit operation vapor space when the vessel is heated is also an emission event. Both of these examples of

emission events and others may occur in the same single unit operation during the course of the batch cycle. If the flow rate measurement for any emission event is zero (0), in accordance with paragraph (5)(F)2. of this rule, then such event is not an emission event for purposes of this rule section.

- B. Calculate the mass emission rate (MER_i) into the control device as follows:

$$MER_i = C_i Q_i$$

where:

C_i = concentration into the control device, and

Q_i = flow rate into the control device.

- C. Calculate the mass emission rate (MER_o) out of the control device as follows:

$$MER_o = C_o Q_o$$

where:

C_o = concentration out of the control device, and

Q_o = flow rate out of the control device.

; and

- D. Calculate the total overall control device efficiency (η) as follows:

$$\eta = (MER_i - MER_o) / MER_i$$

- (G) Upon request by the department to conduct testing, an owner or operator of a batch process operation which has installed a scrubber, a shell and tube condenser using a non-refrigerated cooling media, or any other control device which meets the criteria of subsection

(3)(D) of this rule, shall demonstrate that such device achieves the control efficiency applicable within section (3) of this rule upon the earlier to occur of the date the device is replaced or May 1, 2002.

- (H) The owner or operator of a batch process operation may propose an alternative test method or procedures to demonstrate compliance with the control requirements in section (3) of this rule. Such method or procedures shall be approved by the department.
- (I) In the absence of a request by the department to conduct performance testing in accordance with the provisions of this rule section, a source may demonstrate compliance by the use of engineering estimates or process stoichiometry.

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None.